Technology Demonstration Fact Sheet
Mobile Integrated Temporary Utility System (MITUS)

SUMMARY

During February/March 1997 a Mobile Integrated Temporary Utility System (MITUS) with portable Kiosks was deployed at 105-C Reactor area. This system is being used during decontamination and decommissioning (D&D) activities at the 105-C Reactor and will be implemented in follow-on reactor D&D activities at the Hanford Site.

The MITUS includes a portable trailer-mounted unit substation, up to twenty portable Kiosks, and international orange cables connecting the Kiosks to the Unit Substation. Each Kiosk is a single unit that includes a power receptacle center, a communication/paging/ alarm center, and an emergency lighting pack. Nine Kiosks were connected for the demonstration.

The MITUS underwent testing for power distribution, emergency lighting, and communication/paging/alarm functions. The testing was successful.

This technology will increase safety and productivity of D&D activities by providing well identified power at desired locations, and provide emergency communication capabilities, normal communication capabilities, emergency lighting, and central station cabinet controls and alarm awareness for the Kiosks.

INNOVATIVE TECHNOLOGY DESCRIPTION

This MITUS is designed in accordance with NFPA 70, National Electrical Code 1996; ANSI C2 NESC; and applicable ANSI/IEEE, ANSI, NEMA, and, UL standards. Each Kiosk is equipped with a communication /paging /alarm center that is connected to a central unit stationed at the communication shed. An uninterruptible power supply located at this shed provides continuous power to the communication /paging /alarm system should there be a loss of normal power. Each Kiosk also contains emergency lighting that activates upon loss of normal power, and continues in operation for 90 minutes unless normal power returns earlier than 90 min.

Input voltage requirement for the MITUS unit is three-phase 13,800 volts. The Unit Substation is mounted on a flatbed trailer suitable for over-the- road travel. Output voltage and power from the Unit Substation transformer is 480Y/ 277 volts; the transformer is 750 KVA/ 1000 KVA AA/FA rated. The Kiosks have input voltage requirements of 480 volts AC and transform the voltage to 120 volts, 240 volts, or 208 volts. Several other Kiosks have 480 volts output. All Kiosks use 24 volts DC for communication, alarming, and emergency lighting.

BASELINE TECHNOLOGY DESCRIPTION

The baseline consists of upgrading the existing power distribution equipment in the 105-C Reactor area. The existing power distribution to 105-C is from a 300 KVA, 2.4KV- 80Y/277V transformer. The 2.4KV line powering this transformer is to be de-energized by the electric utility in the future. Once the 2.4KV line is de-energized, upgrading the 105-C existing power system in the plant would require a new transformer made for 13.8KV-480Y/277 volts or the use of generators. Upgrading the existing 105-C electrical system would require a detailed review of the entire electrical system to determine the locations of usable electrical distribution panels, and where new distribution panels would be required. Once the panel locations are determined, each distribution

panel upstream electrical supply must be located and evaluated for its adequacy for service. Once the electrical supply evaluation is completed, the electrical supply to the distribution panels must be refurbished, tested, and placed in service. As D&D work progresses, rooms and areas next scheduled for D&D would be de-energized and temporary power brought in via extension cables to support the D&D. This process would continue until completion of D&D activities. In addition, communication, emergency lighting, and alarms must be established and maintained. This process would be repeated with each reactor.

DEMONSTRATION DESCRIPTION

The MITUS Innovative Technology was demonstrated in two parts: power and communication. The power demonstration included the pre-energization and energization of equipment. Pre-energization of equipment included meggering (flow detection method) of CLX cables, verifying insulation resistances of electrical equipment, operating protective equipment to ensure proper operation, verifying grounding, and verifying that cables are installed correctly.

Voltages were metered for each Kiosk. Emergency lighting was demonstrated for each Kiosk.

The communication demonstration consisted of applying power to all equipment, performing “Page” audio tests; “Party Line” audio tests; Kiosk “Alarm Activation” tests; Central Station Cabinet “Alarm Activation” tests; System “Alarm Prioritization” tests; and Central Station Cabinet “Alarm Priority Page Override” tests.

DETAILS OF BENEFITS

Benefits are in the areas of safety, efficiency of D&D work, power to match field needs, clear quick communication from Kiosk to Kiosk, quick communication from Kiosks to the central station, and quick response to emergencies.

This MITUS technology allows the complete deenergization of existing building power once the MITUS is on line for a reactor. Such complete deenergization allows D&D work to continue unhampered by constraints of local area deactivation and extended zero energy checks.

A further advantage of this technology is the versatility of the power, communication, and alarming system. The power can be moved from place to place; the flexible cables connecting the Kiosks to the unit substation allow free movement of the Kiosks. The use of paging and party lines allows very efficient flow of information, directives, and requests for materials regardless of the location of the Kiosk. Three separate alarms alert each Kiosk and the central station cabinet by both color-coded lights and a tone horn. These alarm conditions are: evacuate, alert, and medical. Each Kiosk has paging capabilities, color-coded alarm lights, and a horn with a distinct tone for each alarm condition. The central station cabinet in the communication shed has the three color-coded alarm lights for each Kiosk and a horn located outdoors to alert supervision to alarm conditions inside the building.

SUCCESS CRITERIA

- Decreased labor hours due to more readily accessible power and faster communication
- Lower radiation exposure due to more effective and more timely communications in higher exposure zones
- Fast response to alarm situations
- Reduced number of zero energy checks

Safer work conditions for D&D activities, especially where electric circuits are involved.

SCHEDULE

Some power testing, such as electric utility testing and checking CLX cables was completed prior to the demonstration. The demonstration for power was completed the week of March 17, 1997 for the remainder of the power tests. The communication / paging / alarm testing was conducted March 24 through 28, 1997.

FUTURE APPLICABILITY

The MITUS will be utilized at the Hanford Site for D&D at other reactors and at canyons after the 105-C project. Westinghouse Savannah River Company HWCTR Project Plan (U) for D&D is planning on installing a MITUS system to provide safer, more reliable power. Reference Document No. WSRV-IM-96- 144.

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